BASIS FOR THE AMENDMENT

Claims 1-114 are active in the present application. Claims 100-104 have been amended in the preamble to recite a system consistent with the system of Claim 99 from which Claim 100-104 depend. Claim 17 has been amended to correct a typographical error. Claim 105-114 are new claims. Support for the new claims is found in the title and in Figure 1 of the drawings. No new matter is added.

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Kibler and the Supervisory Patent Examiner Mehrdad Dastouri for the helpful and courteous discussion of September 14, 2004. During the discussion, Applicants' U.S. representative presented arguments that the prior art references cited against the present claims do not present a *prima facie* case of obviousness.

During the discussion of September 14, 2004, the Office courteously provided translations of two prior art documents (DE 19632988 and FR 2671184). DE 19632988 was cited in the Office Action of June 21, 2004 and is discussed below. FR 2671184 was submitted by Applicants on June 30, 2003 (e.g., before the mailing of any Office Action on the merits). Applicants draw the Office's attention to the following U. S. Patent and Trademark Office administrative procedure:

> Under present practice, second or any subsequent actions on the merits shall be final, *except where the examiner introduces a new ground of rejection that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c)* with the fee set forth in 37 CFR 1.17(p). (see MPEP §70607(a); italics added)

Therefore, any new ground of rejection in a subsequent Office Action in the present application that is not necessitated by Applicants' amendment may not be a final rejection.

The presently claimed invention is drawn, in one embodiment, to a method for detecting a defect in a material web. In this embodiment the invention method includes applying a differential pressure across the material web to remove a liquid present in the material web. By applying a fluid such as a gas to the membrane at a pressure that is between the bubble point pressure of the pores and the bubble point pressure of the defects of the material web and capturing an image of the material web after exposing the material web to the differential fluid pressure, the defects can be identified based upon a captured image of

the material web (see Claim 1). In another embodiment a differential pressure is created by applying vacuum to one side of the continuous material web (see Claim 16).

The bubble point of a material web is the pressure at which a fluid which saturates the material web is forced out of, for example, a pore in the web. Because the pores of material webs are generally smaller in size than any undesired defects, it normally takes greater pressure to force the liquid from the pores of the material web in comparison to the pressure required to force the liquid from defects in the material web. The difference between the bubble point pressure of the pores and the bubble point pressure of the defects may be referred to as the differential bubble point pressure.

By applying a pressure greater than the bubble point pressure of the defects but less than the bubble point pressure of the pores, it may be possible to force liquid from only the defects but not the pores. As the liquid is forced from the defects a bubble may appear on the surface of the material web. This bubble may be detected by capturing an image of the surface of the material web showing the presence of presence of, for example, a bubble.

The defects present in material webs used for applications such as filter membranes may be larger than the desired pore size of the material web. A larger pore size may not be desired because it may allow particles which are intended to be captured by the filter membrane to pass through the filter membrane and thereby contaminate the filtered material. It is desirable to detect such defects as a quality control measure during the production of filter membranes and other material webs.

Each of the claimed methods includes filling at least the defects of the material web with a fluid, applying a differential pressure to the material web and capturing an image of the material web. Each of the claimed systems includes a camera for capturing an image.

The claimed methods take advantage of the difference between the bubble point pressure of the pores of the material web and the bubble point pressure of the defects of the material web (page 5, lines 2-8).

A method for repairing a defect in a material web is also presented (see Claim 42). The method of Claim 42 includes the filling, applying, capturing and identifying active steps of independent Claim 1. Independent Claim 54 is also drawn to a method for detecting a defect; however, the method of Claim 54 does not require that both the defects and the pores of the material web are filled with a fluid. Likewise the method of repairing claimed in independent Claim 93 requires only that the defect is filled with fluid.

In further embodiments, systems for detecting a defect in a material web or for repairing defects in a material web are claimed (see independent Claims 17, 41, 48, 69 and 99). The systems include a camera which captures an image of a material web containing a fluid after the material web has been subjected to a differential pressure that is the between the bubble point pressure of the pores of the material web and the bubble point pressure of any defects in the material web.

The Office rejected the presently claimed methods and systems as obvious in view of patents to Lindsay (U.S. 6,280,573) and Hopkins (U.S. 5,576,480) under 35 U.S.C. §103(a).[1]

Applicants respectfully traverse the rejection on the grounds that the Office has not demonstrated a *prima facie* case of obviousness. For example, the Office asserts that Lindsay:

> "discloses filling a pore and defect with a liquid, applying a differential pressure across the material web so as to remove the liquid from the pore

[1] Applicants note that the Hopkins patent is explicitly mentioned in the present specification and contrasted with the presently claimed invention (see "Background" beginning on page 1 of the present specification).

> and defect [citations omitted], capturing an image of the material web after the differential pressure has been applied [citations omitted], and identifying the defect based on the image [citations omitted]" (page 2, paragraph 3 of the Office Action of June 21, 2003).

Applicants submit that this characterization of Lindsay is not correct. Lindsay nowhere discloses the application of a differential pressure across a material web to remove liquids from a pore and a defect. Although the Office cites to column 1, lines 5-15, column 3, lines 10-37; and Figure 1; as support for this characterization of the prior art, Applicants note that there is no disclosure of the removal of a liquid from a defect in the text of the Lindsay patent cited to by the Office. The text cited by the Office in column 1 of Lindsay merely describes devices for applying a differential pressure to a material web for carrying out, for example, dewatering of the material web. The text cited by the Office at column 3 of Lindsay discloses one aspect of the prior art invention which is a system for detecting and reducing leaks along a seal between a moving web and a web treatment chamber (column 3, line 13).

It appears that the Office is asserting that Lindsay discloses a method or a system for treating a wetted material web so as to detect and/or repair defects in the web. Applicants submit that this is not correct. Lindsay discloses methods for detecting leaks in material web treatment processes and/or devices where the leak occurs at a seal present at the interface of the surfaces of the material web and the border of the chamber which is used to apply a differential pressure to force a fluid through the material web (e.g., for drying the web). In fact, the prior art system and/or method is described as follows (italics added):

> *Pressurized or depressurized web treatment chambers* for processing moving webs can operate more efficiently if fluid leaks are detected and controlled with localized leak detection means... (column 2, lines 31-33).

> The control method of the present invention can provide improved means for *prevention of leaks in web treatment systems* of all kinds wherein a moving *web passes through a pressurized treatment chambe*r (column 2, lines 45-48).

> Further, the control system of the present invention can be used to prevent *leakage of chemicals from a web treatment chamber or to prevent excess infusion of atmospheric air or oxygen into web treatment chamber* by means of localized leak or fusion detectors operated associated with localized leak reduction means to apply *improved sealing* in the localized regions where such action is needed (column 2, lines 49-55).
>
> As used herein, the term "leak" encompasses both the *escape* of fluid from within the chamber (e.g., the escape of pressurized air from an air press) and the *infusion* of fluid *into the chamber* (e.g., infusion of the atmosphere into a low pressure treatment chamber) (column 2, line 65 through column 3, line 3).
>
> Hence in one aspect, the present invention resides in a control system for *detecting and reducing of fluid leaks along a seal between a moving web and a web treatment chamber*, wherein the web treatment chamber applies a fluid at a pressure other than the ambient pressure to a surface of the moving web, the control system comprising:
>
> a) a leak detector for indicating the presence and location of a fluid *leak between the moving web and the seal* (column 3, lines 10-17).

Therefore, Lindsay does not disclose a differential pressure between a defect and a pore of a material web, but instead discloses that a differential pressure may be applied to different surfaces of a material web to force a fluid through the web, for example, to dry the web. The "leaks" associated with Lindsay are not related to defects in the material web but instead are related to the seals which provide a border between the ingress and egress locations of the prior art material web as it passes through a treatment chamber which applies a differential pressure to different surfaces of the material web in order to dry the material web.

Applicants respectfully submit that such a method and/or system carries out a different function than the claimed methods and/or systems (e.g., the prior art describe systems that, for example, dewater material webs, whereas the claimed processes and/or systems carry out a function of detecting defects in material webs). Applicants further submit that the Office has not identified a sufficient nexus between the disclosure of the Lindsay

patent and the presently claimed invention for as a basis for applying the Lindsay patent as pertinent prior art.

With regard to the Office's citation to column 7, lines 5-7 and 27-57 of Lindsay as support for the assertion that Lindsay discloses capturing an image of a material web after differential pressure has been applied thereto, Applicants note that the disclosure at column 7, lines 5-7 is merely an introductory paragraph to different leak detectors. The disclosure at column 7, lines 27-53 refers to "thermal flow detection means" which are disclosed to include "heat flux detectors, hot wire anemometers, cycrometers, web bulb thermometers, wetted surface thermometers, thermocouples, thermistors, infrared detectors, liquid crystal thermal displays and IR-sensitive cameras." Applicants submit that the thermal flow detection disclosed in column 7 of Lindsay is not the image capture recited in the present claims because the thermal flow detection of Lindsay is for detecting leaks at the seal between the material web and the pressure chamber. The Lindsay thermal flow detection does not capture an image of the material web after a differential pressure has been applied thereto.

Applicants note that "flow visualization means" are described at column 8, lines 29-49 of Lindsay. The flow visualization is "applied to make a local leak visible" (column 8, lines 29-30). In Lindsay the flow visualization and thermal flow detection are used to identify an "escaping fluid" (column 8, line 38). In Lindsay the thermal flow detection or flow visualization means are not used to capture an image of the material web but rather are used to detect flows emanating from the material web. Lindsay does not disclose the presently recited "capturing an image of said material web after said differential pressure has been applied" (see present independent Claim 1).

The Office admits in the paragraph bridging pages 2 and 3 of the Office Action that Lindsay does not disclose the differential pressure recited in the present claims. The Office applies Hopkins to cure the defects of Lindsay. The Office asserts that Hopkins discloses that

a differential pressure may be applied to a material web to remove liquid from either a pore or a defect present in the material web and therefore a differential pressure exists between the bubble point pressures of the defects and the pores of the prior art material web. The Office asserts that Lindsay and Hopkins are combinable "because they are from the same field of endeavor of porous material inspection".

As already discussed above, Applicants submit that the Lindsay disclosure is not pertinent prior art to the claimed invention because the detection of Lindsay is with regards to leakage at a seal between a material web and a pressure chamber and which may not be relevant to the detection of defects of the material web. Applicants traverse the combination of Lindsay and Hopkins on the grounds that Lindsay is drawn to the detection of leaks present at the ingress and egress points of a moving material web as it enters and exits a treatment chamber that applies a differential pressure across the surfaces of the material web. Lindsay is drawn to process such as dewatering of material webs. The leaks of Lindsay have nothing to do with defects in the material web but instead have to do with the reliability of the ingress and egress points defining the interface of the treatment chamber with the material web.

Moreover, Lindsay does not disclose capturing an image of the surface of the material web but rather discloses using visualization and detection means to identify flows associated with leakage surrounding the treatment chamber/material web interface (e.g., seal). As mentioned before, Lindsay does not disclose (i) capturing an image of a material web surface or (ii) detecting defects in material webs.

It appears that the Office is applying Hopkins as a teaching that one of ordinary skill in the art would use an image capturing step or device in either a method or a system for detecting defects in material webs. However, Hopkins nowhere discloses the use of an image

capturing device and/or step.[2] As already mentioned above, the flow visualization means disclosed in Lindsay is not the same as the image capturing of the present claims. Therefore the combination of Lindsay and Hopkins does not disclose one of the present claim limitations, namely "capturing an image of said material web after said differential pressure has been applied" (see for example present independent Claim 1) and cannot render obvious the presently claimed subject matter.

Applicants submit that none of the disclosure cited to by the office in the further cited prior art including Karjanmaa (WO 00/451156); McHenry (U.S. 5,672,388); Fujita (U.S. 6,535,621); or Burkhart (DE 19632988); cures the defects of Lindsay and Hopkins.

New dependent Claim 105-114 have been added. The new independent claims further limit independent Claims 1, 16, 17, 41, 42, 48, 54, 69, 93 and 99. The new dependent claims require that the methods are carried out continuously on a flat material web. The material webs present in the claimed system are now required to be continuous and flat. The new dependent claims are drawn to subject matter that cannot be obvious or anticipated by processes wherein the defect detection and/or repair is carried out on a finished filter element (such as a spiral would filter element) because such methods must be carried out one filter at a time and not continuously as required by the present claims.

With regard to the statement on page 4, lines 6-7 of the Office Action of June, 21, 2004, regarding the advantages of a vacuum roller, Applicants submit herewith U.S. Patent No. 6,634,192 to Simonetti. In Simonetti, it is disclosed that conventional methods of wetting a substrate (e.g., a filter membrane) include mass transfer and water bearing techniques (column 1, lines 22-24 and 42-45). These processes have drawbacks with regards

[2] Hopkins discloses acoustic methods for detecting leaks at material webs (see for example column 1, lines 14-15; column 1, lines 62-57; column 3, lines 43-47 and a column 3, lines 61-63).

to speed and damage to the membrane (column 1, lines 28-31 and column 2, lines 24-27). A vacuum roller based system is improved over the conventional systems:

> [The invention] system has improved flushing capabilities over currently used systems because the vacuum pressure applied to the web by the vacuum roller increases the pressure differential across the membrane web, thereby increasing the driving force for removal of the first solvent and replacement with the second solvent (column 1, lines 40-46).

On page 1 of the Office Action of June 21, 2004 it is stated that the the IDS of 5/22/01 was not considered because a statement of relevance for each patent not in the English language was not provided. Applicants submit that the IDS of 5/22/01 provided four patent documents categorized as U.S. Patent Documents. Further, signed and dated copies of the IDS of 5/22/01 and the IDS of June 30, 2003 were returned with the Office Action of June 21, 2004. Applicants request clarification.

Applicants respectfully submit the prior art of record is not sufficient for establishing a *prima facie* case of obviousness of the presently claimed subject matter and submit that the presently claimed subject matter is patentable over the prior art of record. Applicants respectfully request the withdrawal of the rejections and the passage of all now-pending claims to Issue.

Respectfully submitted,

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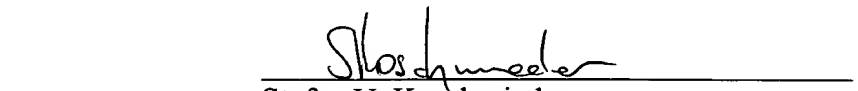

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